107TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { 107–520

ENTERPRISE INTEGRATION ACT OF 2002

JUNE 20, 2002.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. BOEHLERT, from the Committee on Science, submitted the following

R E P O R T

[To accompany H.R. 2733]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, to whom was referred the bill (H.R. 2733) to authorize the National Institute of Standards and Technology to work with major manufacturing industries on an initiative of standards development and implementation for electronic enterprise integration, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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99–006

I. AMENDMENT

The amendment is as follows:
Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Enterprise Integration Act of 2002".

SEC. 2. FINDINGS.

The Congress makes the following findings:

(1) Over 90 percent of United States companies engaged in manufacturing are small and medium-sized businesses.

(2) Most of these manufacturers produce goods for assemblage into products of large companies.

(3) The emergence of the World Wide Web and the promulgation of international standards for product data exchange greatly accelerated the movement toward electronically integrated supply chains during the last half of the 1990's.

(4) European and Asian countries are investing heavily in electronic enterprise standards development, and in preparing their smaller manufacturers to do business in the new environment. European efforts are well advanced in the aerospace, automotive, and shipbuilding industries and are beginning in other industries including home building, furniture manufacturing, textiles, and apparel. This investment could give overseas companies a major competitive advantage.

(5) The National Institute of Standards and Technology, because of the electronic commerce expertise in its laboratories and quality program, its long history of working cooperatively with manufacturers, and the nationwide reach of its manufacturing extension program, is in a unique position to help United States large and smaller manufacturers alike in their responses to this challenge.

(6) It is, therefore, in the national interest for the National Institute of Standards and Technology to accelerate its efforts in helping industry develop standards and enterprise integration processes that are necessary to increase efficiency and lower costs.

SEC. 3. ENTERPRISE INTEGRATION INITIATIVE.

(a) ESTABLISHMENT.—The Director shall establish an initiative for advancing enterprise integration within the United States. In carrying out this section, the Director shall involve, as appropriate, the various units of the National Institute of Standards and Technology, including the National Institute of Standards and Technology laboratories (including the Building and Fire Research Laboratory), the Manufacturing Extension Partnership program established under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l), and the Malcolm Baldrige National Quality Program. This initiative shall build upon ongoing efforts of the National Institute of Standards and Technology and of the private sector, shall involve consortia that include government and industry, and shall address the enterprise integration needs of each United States major manufacturing industry at the earliest possible date.

(b) ASSESSMENT.—For each major manufacturing industry, the Director may work with industry, trade associations, professional societies, and others as appropriate, to identify enterprise integration standardization and implementation activities underway in the United States and abroad that affect that industry and to assess the current state of enterprise integration within that industry. The Director may assist in the development of roadmaps to permit supply chains within the industry to operate as an integrated electronic enterprise. The roadmaps shall be based on voluntary consensus standards.

(c) REPORTS.—Within 180 days after the date of the enactment of this Act, and annually thereafter, the Director shall submit to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the National Institute of Standards and Technology's activities under subsection (b).

(d) AUTHORIZED ACTIVITIES.—In order to carry out this Act, the Director may work with industry, trade associations, professional societies, and others as appropriate—

(1) to raise awareness in the United States of enterprise integration activities in the United States and abroad, including by the convening of conferences;

(2) on the development of enterprise integration roadmaps;

(3) to support the development, testing, promulgation, integration, adoption, and upgrading of standards related to enterprise integration including application protocols; and

(4) to provide technical assistance and, if necessary, financial support to small and medium-sized businesses that set up pilot projects in enterprise integration.

(e) MANUFACTURING EXTENSION PROGRAM.—The Director shall ensure that the Manufacturing Extension Program is prepared to advise small and medium-sized businesses on how to acquire the expertise, equipment, and training necessary to participate fully in supply chains using enterprise integration.

SEC. 4. DEFINITIONS.

For purposes of this Act—

(1) the term "automotive" means land-based engine-powered vehicles including automobiles, trucks, busses, trains, defense vehicles, farm equipment, and motorcycles;

(2) the term "Director" means the Director of the National Institute of Standards and Technology;

(3) the term "enterprise integration" means the electronic linkage of manufacturers, assemblers, suppliers, and customers to enable the electronic exchange of product, manufacturing, and other business data among all partners in a product supply chain, and such term includes related application protocols and other related standards;

(4) the term "major manufacturing industry" includes the aerospace, automotive, electronics, shipbuilding, construction, home building, furniture, textile, and apparel industries and such other industries as the Director designates; and

(5) the term "roadmap" means an assessment of manufacturing interoperability requirements developed by an industry describing that industry's goals related to enterprise integration, the knowledge and standards including application protocols necessary to achieve those goals, and the necessary steps, timetable, and assignment of responsibilities for acquiring the knowledge and developing the standards and protocols.

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Director to carry out functions under this Act—

(1) $2,000,000 for fiscal year 2002;

(2) $10,000,000 for fiscal year 2003;

(3) $15,000,000 for fiscal year 2004; and

(4) $20,000,000 for fiscal year 2005.

II. PURPOSE OF THE BILL

The purpose of H.R. 2733, the Enterprise Integration Act of 2002 is to authorize the National Institute of Standards and Technology (NIST) to work with major manufacturing industries on an initiative of standards development and implementation for electronic enterprise integration. Through this initiative, NIST will help industries reach a consensus on their electronic data exchange standards needs, support the development of those standards and help smaller businesses in those industries to automate. When industries are fully integrated electronically, information will flow to all companies along the supply chains within the industry without corruption or loss. For example, if Ford changes a design specification for a bumper, every one of the suppliers that contribute to that part would be able to quickly and easily see how the new specification affects their component. This kind of integration will help large and small businesses in the industry's supply chains to reduce costs and design cycles times. Suppliers, especially small businesses, that do not have the capability to collect data needed by others in the supply chain and to exchange it electronically run the risk of being replaced by other suppliers who can.

III. BACKGROUND AND NEED FOR THE LEGISLATION

The application of the Internet to manufacturing has led to companies being asked to work together electronically in ways that were impossible just a few years ago. Design times and useful lives of manufactured goods are shrinking dramatically. Manufacturers in today's marketplace must be more flexible, efficient, and responsive to changes in customer preference. Around the world, manufacturers who wish to stay competitive are shifting to a new manufacturing environment in which designs and assembly lines change quickly and where all of the companies involved in manufacturing a product must be able to share designs, engineering data, and production information regularly and instantaneously. This change has been made possible by advances in networking, shop-floor automation, and product data exchange software.

Developing a seamless exchange of information, without data loss or corruption, along a vertical supply chain is known as "enterprise integration". Enterprise integration permits a group of manufacturers and suppliers to operate as a single virtual company. Achieving enterprise integration among an original equipment manufacturer such as Ford or Boeing and all levels of its supply chain would lead to dramatically reduced amounts of time spent in the design and manufacturing of specific products. A 1999 study commissioned by NIST estimated potential savings in the auto supply chains of General Motors, Ford, and Chrysler from enterprise integration of at least $1 billion per year. Similarly dramatic savings are possible in shipbuilding, major construction, homebuilding, furniture manufacturing, electronics manufacturing, textiles and apparel, and all other industries whose products depend on a series of companies working efficiently together. A February 2001 report of the National Coalition for Advanced Manufacturing identified ways that the Federal Government, manufacturing industries, software companies, and private sector consultants could work together to promote enterprise integration. This bill addresses several of these recommendations.

The large number of incompatible design, engineering, and manufacturing systems now in place within a typical supply chain complicates enterprise integration. Before the Internet, factories were automated with no thought of sharing manufacturing data. Factories installed those software packages that best met their individual needs and often developed custom software for unique problems. This has led to a typical supply chain containing suppliers using a variety of different software packages. For enterprise integration to work, all of these software systems must either be replaced at great expense or must be made to work together. Incompatibility problems get worse the farther down the supply chain one goes. Companies at the bottom of supply chains, such as tool and die makers, are being asked to be able to supply data compatible with all of the manufacturers higher up the chain. This frequently places an intolerable burden on the companies least able to afford multiple software systems.

One promising solution to compatibility problems in design and manufacturing software is product data exchange standards, an area where NIST has 20 years of experience. This family of standards sets the rules for exchanging all manufacturing data including

three-dimensional models of parts and processes. The basic product data exchange standard has been adopted as an international standard but the hard work of developing additional standards permitting product data exchange in specific industries is just getting underway. Product data exchange standards that permit interoperability among the various design and manufacturing software packages used by an industry can run tens of thousands of pages of text. These standards can be thought of as huge dictionaries that make sure that colors, materials, processes, and all other variables in manufacturing a ship or a plane can be translated in a way that protects the proprietary information of the various companies in the industry. The European Union understands the importance of enterprise integration and is aggressively pursuing the development of application protocols in each of the manufacturing sectors mentioned above.

For U.S.-based companies to participate fully in manufacturing that uses enterprise integration, NIST must be integrally involved in the process of developing these standards. If it is not, the United States runs the risk of the application protocols being promulgated as international standards in forms that are incompatible with some U.S. software packages. Should this happen, U.S. companies would be at a substantial competitive disadvantage and faced with the replacement of large amounts of costly software. H.R. 2733 is designed to help solve several aspects of this problem. NIST will help industry sectors to achieve a common understanding of enterprise integration within U.S. industry sectors through cooperative public and private efforts in road mapping. It will support product data exchange standards development including pilot efforts. Automation support of small manufacturers will be accelerated through NIST's Manufacturing Extension Program.

The National Institute of Standards is the natural organization to take the lead for the United States in promoting enterprise integration. NIST has a long track record in manufacturing and has done or sponsored much of the government research on the factory of the future and factory automation that has helped bring us to the point where we can contemplate enterprise integration and virtual companies. NIST has worked closely with the leading private sector companies that develop manufacturing software and that help industries understand how to position themselves to take advantage of the technology. Rather than compete with the private sector, it has worked cooperatively with benchmarking companies such as IMTI in Oak Ridge, Tennessee and organizations such as ERIM (now Altarum) and PDES, Inc., that have been pioneers in the development of product data exchange software. NIST was the first of the National laboratories and has over 100 years of experience working with industry and with manufacturers. It also has the largest role of any Federal agency in international standards. For the last 14 years, NIST through its Manufacturing Extension Partnership has worked with state and local governments, educational institutions, and private consultants to make sure that any manufacturer who wishes to become more competitive can acquire the knowledge and equipment to do so.

IV. SUMMARY OF HEARINGS

There were no hearings on H.R. 2733 in the current Congress. However, on June 22, 2000, the Committee on Science's Subcommittee on Technology held a hearing entitled E-Commerce, A Review of Standards and Technology to Support Interoperability. Witnesses included Dr. Karen Brown, Deputy Director, National Institute of Standards and Technology; Mr. Keith Krach, Chief Executive Officer and Chairman of the Board of Ariba; and Mr. Ken Baker, President of ERIM. Dr. Brown discussed NIST's role in working closely with the private sector to provide tools such as measurements and standards for hardware, software, and networks infrastructure; direct hands-on assistance through Manufacturing Extension Partnership (MEP) to U.S. small manufacturers; and cofunding private sector research through the ATP to develop new technologies. Mr. Ken Baker testified that the problem of interoperability in the U.S. industrial supply chain costs American automotive industry more than $1 billion each year. ERIM's Center for Electronic Commerce has been working on interoperability issues for over 10 years. They have also worked with the Automotive Industry Action Group (AIAG) and NIST to conduct pilots to improve the quality and timeliness of data exchange among current automotive manufacturers and their suppliers.

V. COMMITTEE ACTIONS

On August 2, 2001, Mr. Barcia and Mr. Ehlers introduced H.R. 2733. The bill was referred to the Committee on Science and its Subcommittee on Environment, Technology, and Standards. The Subcommittee marked up the bill on December 12, 2001 and ordered the bill reported to the Full Committee by a voice vote. H.R. 2733 was then ordered reported by the Committee on Science on May 22, 2002.

VI. SUMMARY OF MAJOR PROVISIONS OF THE BILL

H.R. 2733 requires the Director of the National Institute of Standards and Technology to establish an initiative for advancing enterprise integration within the United States. This initiative is to draw on all relevant parts of NIST and its contractors as well as on other private sector experts. Under the bill, NIST, using in-house capabilities as well as the talents of private sector organizations with road-mapping expertise, will work with all major manufacturing sectors that desire to develop roadmaps that outline the steps for a specific industry to become integrated electronically. NIST will also support the development of voluntary consensus product data exchange standards that will permit all of the manufacturing software programs used in an industry to use data generated under the other systems.

VII. SECTION-BY-SECTION ANALYSIS (BY TITLE AND SECTION)

Sec. 1—Short title

Enterprise Integration Act of 2001.

Sec. 2—Findings

The legislation finds it is in the national interest that the National Institute of Standards and Technology (NIST) accelerate its ongoing efforts to help major manufacturing sectors develop enterprise integration standards because most companies involved in manufacturing are small businesses, because the emergence of the Internet has accelerated the movement towards electronically integrated supply chains, because European and Asian countries are giving their companies a competitive advantage by investing heavily in electronic enterprise standards and in preparing their smaller manufacturers to participate in this new business environment, and because NIST's long history of assisting manufacturers puts it in a unique position to help both American supply chains and the small businesses that are part of them.

Sec. 3—Enterprise integration initiative

The Director of NIST is to establish an enterprise integration initiative to permit electronic exchange of product data among the companies including small businesses that make up major manufacturing sectors. The initiative shall involve the NIST laboratories, the manufacturing Extension Program, and the Malcolm Baldrige National Quality Program, where appropriate. The initiative is to build on NIST's long history of working with the private sector in this area. NIST also is to take advantage of private sector expertise in areas such as adapting B2B standards in manufacturing sectors as diverse as autos and furniture, in pilot projects, and in demonstrations of best industry practices.

This initiative will help industry representatives, organizations, and others from major manufacturing sectors who are currently engaged in enterprise integration activities to identify all enterprise standardization and implementation activities underway affecting that industry. It is assumed that NIST and its contractors will assist industry representatives and organizations in the development of roadmaps that will identify the remaining steps needed to ensure that supply chains in the industry can operate as an integrated electronic enterprise.

Within 90 days of the enactment of this Act, the Director shall submit to Congress a report on the efforts to publicize the program and the anticipated related activities of the initiative, and within 180 days, and annually thereafter, a report on the activities of the initiative.

The Director may carry out the following activities in support of the legislation:

(1) Work with companies and trade associations to raise awareness of enterprise integration activities;

(2) Work with industries on the development of enterprise integration roadmaps;

(3) Support the development, testing, promulgation, and adoption of standards;

(4) Support the integration and upgrading of standards related to enterprise integration;

(5) Support pilot projects that include small and medium-sized businesses for new standards and enterprise integration;

(6) Ensure the training and continuing education of Manufacturing Extension Program (MEP) employees;

(7) Develop tool kits and training materials to permit small and medium-sized businesses to participate in an integrated enterprise; and

(8) Set up legal and financial mechanisms to permit groups of MEP centers to work collectively on modernizing and integrating a company's or an industry's supply chain.

Sec. 4—Definitions

The term "enterprise integration" is defined as the electronic linkage of manufacturers, assemblers, suppliers, and customers to enable all the partners in a product supply chain to exchange standards and other information related to the manufacture and supply of products.

The term "major manufacturing industry" includes: aerospace, automotive, electronics, shipbuilding, construction, home building, furniture, textile, and apparel industries, and such other industries as the Director designates.

The term "automotive" is defined as land-based engine-powered vehicles including: automobiles, trucks, busses, trains, defense vehicles, farm equipment, and motorcycles.

Sec. 5—Authorization of appropriations

Fiscal year 2002—$2 million.
Fiscal year 2003—$10 million.
Fiscal year 2004—$15 million.
Fiscal year 2005—$20 million.

VIII. COMMITTEE VIEWS

The Committee expects that the program set forth in H.R. 2733 will be a logical extension of NIST's 20 plus years of close cooperation with the private sector in developing the standards required by modern manufacturing. The purpose of this legislation is to bring a renewed sense of urgency to this important mission and to make sure that America's smaller manufacturers are world-class and have the capabilities to participate in virtual companies. This enhanced effort is important because the United States is facing a serious challenge from other countries that are investing large sums to make sure that the international standards for manufacturing favor their domestic companies. Product data exchange standards is an area where the United States has been a leader, but where its leadership faces a serious challenge. Therefore, H.R. 2733 has been designed to bring the best talent available from NIST and its contractors, from manufacturers, and from companies that support manufacturers into an effective partnership to meet this challenge. To accomplish this objective in a reasonable timeframe, NIST is encouraged to continue to supplement its in-house expertise with that of contractors in road mapping, in adapting these standards to the needs of each of these sectors, and in carrying out pilot projects to support the initiative.

IX. COST ESTIMATE

A cost estimate and comparison prepared by the Director of the Congressional Budget Office under section 402 of the Congressional Budget Act of 1974 has been submitted in a timely manner to the Committee on Science prior to the filing of this report and is in-

cluded in Section X of this report pursuant to House Rule XIII, clause 3(c)(3).

H.R. 2733 does not contain new budget authority, credit authority, or changes in revenues or tax expenditures. Assuming that the sums authorized under the bill are appropriated, H.R. 2733 does authorize additional discretionary spending, as described in the Congressional Budget Office report on the bill, which is contained in Section X of this report.

X. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, June 3, 2002.

Hon. SHERWOOD L. BOEHLERT,
Chairman, Committee on Science,
House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 2733, the Enterprise Integration Act of 2001.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Ken Johnson.

Sincerely,

STEVEN M. LIEBERMAN
(For Dan L. Crippen, Director).

Enclosure.

H.R. 2733—Enterprise Integration Act of 2001

Summary: H.R. 2733 would require the National Institute of Standards and Technology (NIST) to perform research, provide technical assistance, and develop standards related to enterprise integration. Enterprise integration is the effort to facilitate the exchange of data among manufacturing companies within supply chains. The bill would authorize the appropriation of $47 million over four years to carry out these activities.

Assuming the appropriation of the specified amounts, CBO estimates that implementing H.R. 2733 would cost about $47 million during the 2002–2007 period. The bill would not affect direct spending or receipts; therefore, pay-as-you-go procedures would not apply.

H.R. 2733 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would not affect the budgets of state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of H.R. 2733 is shown in the following table. The costs of this legislation fall within budget function 370 (commerce and housing credit).

	By fiscal year, in millions of dollars—					
	2002	2003	2004	2005	2006	2007
CHANGES IN SPENDING SUBJECT TO APPROPRIATION						
Authorization level	2	10	15	20	0	0
Estimated outlays	0	10	14	19	4	0

Basis of estimate: H.R. 2733 authorizes the appropriation of $47 million over four years for NIST to undertake a variety of activities to promote enterprise integration. For this estimate, CBO assumes that the bill will be enacted before the end of fiscal year 2002, that funds will be appropriated around the beginning of each fiscal year, and that funds for 2002 will be provided in a supplemental appropriation. Based on the historical spending patterns of similar NIST programs, CBO estimates that implementing H.R. 2733 would cost about $10 million in 2003 and $47 million over the 2003–2006 period, assuming the appropriation of the specified amounts.

Pay-as-you-go considerations: None.

Intergovernmental and private-sector impact: H.R. 2733 contains no intergovernmental or private-sector mandates as defined in UMRA and would not affect the budgets of state, local, or tribal governments.

Estimate prepared by: Federal costs: Ken Johnson; impact on state, local, and tribal governments: Angela Seitz; impact on the private sector: Patrice Gordon.

Estimate approved by: Peter H. Fontaine, Deputy Assistant Director for Budget Analysis.

XI. COMPLIANCE WITH PUBLIC LAW 104–4

H.R. 2733 contains no unfunded mandates.

XII. COMMITTEE OVERSIGHT FINDINGS AND RECOMMENDATIONS

The Committee on Science's oversight findings and recommendations are reflected in the body of this report.

XIII. STATEMENT ON GENERAL PERFORMANCE GOALS AND OBJECTIVES

The goals and objectives of this legislation are to enhance NIST's efforts in support of enterprise integration. They include the development of roadmaps leading to enterprise integration of interested manufacturing sectors, to continue to use the talent both in the government and in the private sector that has traditionally worked on these problems, to make sure that international product data exchange standards adequately reflect U.S. interests, and to increase the involvement of NIST's Manufacturing Extension Program in aiding the small and medium sized firms as they acquire the skills they need to participate in enterprise integration.

XIV. CONSTITUTIONAL AUTHORITY STATEMENT

Article 1, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 2733.

XV. FEDERAL ADVISORY COMMITTEE STATEMENT

H.R. 2733 does not establish or authorize the establishment of an advisory committee.

XVI. CONGRESSIONAL ACCOUNTABILITY ACT

The Committee finds that H.R. 2733 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVII. STATEMENT ON PREEMPTION OF STATE, LOCAL, OR TRIBAL LAW

This bill is not intended to preempt any state, local, or tribal law.

XVIII. CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

This legislation does not amend any existing Federal statute.

XIX. COMMITTEE RECOMMENDATIONS

On May 22, 2002, a quorum being present, the Committee on Science favorably reported the Enterprise Integration Act of 2002 by a voice vote, and recommended its enactment.

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